CONTENTS

Volume 2, Issue Nos 1–6

COMMUNICATIONS IN APPLIED NUMERICAL METHODS

Issue No. 1, January—February 1986

## *Inverse Design Concepts in Engineering Sciences*

Ill-posed Design Methods for the Computation of Inviscid Flows: H. J. Wirz ..... 1

Considerations on Existence and Uniqueness in Numerical Inverse Design: G. Moretti ..... 11

Shock-free Transonic Rotor Design: T. C. Prince and P. P. Beauchamp ..... 21

Shock-free Redesign Using Finite Elements: G. F. Carey and T. T. Pan ..... 29

The Design of Shock-free Supercritical Airfoils Including Viscous Effects: A. A. Hassan ..... 37

An Engineering Approach to the Inverse Transonic Wing Design Problem: E. Greff and J. Mantel ..... 47

The Application of Inverse Boundary Layer Methods to the Three-dimensional Viscous Design Problem: S. G. Lekoudis, N. L. Sankar and J. B. Malone ..... 57

A Quasi Three-dimensional Inverse Design Method Using Source and Vortex Integral Equations: M. Ribaut and D. Martin ..... 63

On the Use of Inverse Modes of Calculation in Two-dimensional Cascades and Ducts: G. Meauzé ..... 73

Inverse Design of Axisymmetric Flow Passages Using Compressible Viscous Flow Theory: F. Ntone and T-T. Yang ..... 83

The Role of a Mixed Design and Analysis Method in a Turbomachinery Blade Design System: R. D. Cedar and P. Stow ..... 91

Properties of a Space-wise Periodic Flow Application to Flow Computation and Design for Blade Cascades: H. H. Miton ..... 101

The Inverse Method Applied to a Body of Revolution with an Extended Favourable Pressure Gradient Forebody: M. F. Zedan and C. Dalton ..... 113

CONFERENCE DIARY ..... 121

ANNOUNCEMENTS ..... 121

Issue No. 2, March—April 1986

On the Gaussian Quadrature Rule for Finite-part Integrals with a First-order Singularity: N. I. Ioakimidis ..... 123

Computation of Stress Field Parameters in Areas of Steep Stress Gradients: B.A. Szabó ..... 133

Inviscid Vortex-stretched Turbulent Shear-layer Flow Computed Around a Cranked Delta Wing: A. Rizzi and C. J. Purcell ..... 139

Element-by-element Linear and Nonlinear Solution Schemes: G. F. Carey and B.-N. Jiang ..... 145

Temperature Fields in Simulation of Butt-welding of Large Plates: L.-E. Lindgren 155

A Generalized Displacement Method for Finite Element Analysis of Constrained Problems: L. Xikui and G. Q. Liu ..... 165

Removal of Singularities in Tresca and Mohr–Coulomb Yield Functions: S. W. Sloan and J. R. Booker ..... 173

Explicit Integration and the Isoparametric Arch and Shell Elements: M. A. Crisfield 181

A Note on the Comparison Between BIE and FD Techniques for Solving Elliptic BVPs with Boundary Singularities: D. B. Ingham and M. A. Kelmanson ..... 189

Extension of the Generalized Benders' Decomposition: R. Lazimy ..... 195

Explicit Basis Functions of Quadratic and Improved Quadratic Finite Element Spaces for the Stokes Problem: PH. Caussignac ..... 205

Multiple Use of a Shortest Route Tree for Ordering: A. Kaveh ..... 213

The Finite Element Analysis of Homogeneous and Laminated Composite Plates Using a Simple Higher Order Theory: J. G. Ren and E. Hinton ..... 217

Application of Finite Elements in Heat Exchangers: S. G. Ravikumaur, K. N. Seetharamu and P. A. Aswathanarayana ..... 229

BOOK REVIEW ..... 235

ANNOUNCEMENTS ..... 235

CONFERENCE DIARY ..... 237

Issue No. 3, May—June 1986

***Partial Differential Equations and Algorithms for Advanced Processors***

A Marching Method for Solving Poisson's Equation on the ETA$^{10}$: S. E. Follin and M. J. Kascic, Jr. ..... 239

Some Ideas for Decomposing the Domain of Elliptic Partial Differential Equations in the Schwarz Process: G. Rodrigue ..... 245

Numerical Algorithms on the Crystal Multicomputer: R. R. Meyer ..... 251

Communications Oriented Programming of Parallel Iterative Solutions of Sparse Linear Systems: M. L. Patrick and T. W. Pratt ..... 255

Reordering Computations for Parallel Execution: L. Adams ..... 263

Overhead Considerations for Parallelizing Conjugate Gradient: M. K. Seager ..... 273

Parallelism in Finite Element Modelling: G. F. Carey ..... 281

Vectorized Iterative Methods for Partial Differential Equations: D. R. Kincaid, T. C. Oppe and D. M. Young ..... 289

Application of Vector Processors to Chemical-enhanced Oil Recovery Simulation: A. Datta Gupta, G. Pope, K. Sepehrnoori and B. Mossberg ..... 297

Subdivision of PDE's on FPS Scientific Computers: J. L. Gustafson ..... 305

Elliptic Equation Algorithms on Parallel Computers: O. A. McBryan and E. F. van de Velde ..... 311

Element Stiffness Computation on CDC CYBER 205 Computer: A. K. Noor and J. M. Peters ..... 317

CONFERENCE DIARY ..... 329

ANNOUNCEMENT ..... 330

Issue No. 4, July—August 1986

Calculation of Confined Swirling Jets: C. P. Chen ..... 333

An Efficient Program for Generating Subminimal Cycle Bases for the Flexibility Analysis of Structures: A. Kaveh ..... 339

On Thermal Stress Calculation: G. P. Mulligan ..... 345

Heat Exchange Effects During Underground Gasification of Thin Coal Layers: H. Ronde, J. Bruining, J. P. Oude Essink and A. P. E. Maljaars ..... 349

Free Vibration of a Plate with Arbitrary Shape on a Finite Elastic Foundation in Consideration of Effects of Masses of Foundation: K. Nagaya and J. Takeuchi. 359

Hourglassing Control Through Boundary Smoothing: J. C. Schulz and O. E. R. Heimdahl ..... 369

Pressure Related Instabilities of Reduced Navier–Stokes Equations for Internal Flows: S. W. Armfield and C. A. J. Fletcher ..... 377

Acceleration of Vector Sequences by Multi-dimensional $\Delta^2$ Methods: A. J. MacLeod ..... 385

A Finite Element Model for Tidal and Residual Circulation: R. A. Walters ..... 393

On Accelerating the Convergence Rate of Iterative Methods in Elastic–Plastic Stress Analysis: H. A. El-Ghazaly and A. N. Sherbourne ..... 399

Numerical Calculation of the Elastic Field in a Half-space: J. J. Kalker ..... 401

A Multi-level Block Iterative Method for Mixed Finite Strip/Finite Element Analysis: T. R. Graves Smith and J. T. Gierlinski ..... 411

A Viscous–Inviscid Coupling Method for the Design of Low Reynolds Number Aerofoil Sections: A. A. Hassan ..... 419

BEM—Condition Number of Systems Obtained When Solving Mixed Boundary Value Potential Problems: J.-L. Migeot ..... 429

On the Determination of the Roots of Some Classes of Transcendental Equations: M. D. Mikhailov and M. N. Özişik ..... 437

CONFERENCE DIARY ..... 447

ANNOUNCEMENT ..... 447

Issue No. 5, September—October 1986

High Order Difference Group Explicit (HODGE) Methods: W. S. Yousif and D. J. Evans ..... 449

Oscillatory Integrals by Hermite Interpolatory Rules: A. Alaylioglu ..... 463

On Matching the SS*pj* and GN*pj* Algorithms: W. L. Wood ..... 471

On Computing Eigenvalues of Two-point Boundary Value Problems: R. A. Usmani 477

On the Numerical Solution of the Riccati Algebraic Matrix Equation: T. M. El-Gindy, M. S. Salim and M. S. Farghaly ..... 483

Improvement of the Runtime Behaviour of a Frontal Solution Code: D. Gloos, W. Hoehn and P. Spellucci ..... 489

OAHM: a Fortran Subroutine for Solving a Class of Unsymmetric Linear Systems of Equations: G. J. Makinson and A. A. Shah ..... 499

Enhancing Interactivity and Automation through Finite Element Neighbours: S. Ratnajeevan H. Hoole ..... 509

Flow in a Coiled Tube: the Effect of Mesh Pattern on the Convergence Rate of Predicted Critical Points: K. H. Winters and T. W. Brown ..... 519

An Explicit Form of the Plastic Matrix for a Mohr–Coulomb Material: D. V. Griffiths and S. M. Willson ..... 523

On the Use of a Standard Quadratic Element in the Analysis of Consolidation following External Loading: H. R. Thomas and H. M. Harb ..... 531

Modified Bandwidth Reduction Algorithm: J. Rząsa ..... 541

BOOK REVIEW ..... 543

CONFERENCE DIARY ..... 544

ANNOUNCEMENTS ..... 545

Issue No. 6, November—December 1986

The Recent Advances of MWR for Solid Mechanics in China: X. Cida ..... 549

An Accurate Explicit Finite Difference Technique for Solving the One-dimensional Wave Equation: B. J. Noye and M. J. Rankovic ..... 557

MacCormack's Scheme Applied to Plane Wave Propagation in a Linear Viscoelastic Solid: S. A. Lorimer and J. B. Haddow ..... 563

Analysis of Cylindrical Shells Under Patch Loading: J. S. Lin, M. Hourani, P. L. Gould, T. G. Harmon and K. J. Han ..... 571

Improved Approximate Methods for Analysing Steady Heat Conduction: C. W. Bert ..... 587

A Fourth-order Extrapolation Method for Special Nonlinear Fourth-order Boundary Value Problems: E. H. Twizell ..... 593

A Relaxation Technique for the Parabolized Navier–Stokes (PNS) Equations: U. K. Kaul ..... 603

A Computational Method for Solving Singular Perturbation Problems Using Fourth-order Finite Differences: M. K. Kadalbajoo and Y. N. Reddy ..... 609

Curved Beam Element Via Penalty/Mixed Formulation for Nonlinear In-plane Analysis: E. Akoussah, D. Beaulieu and G. Dhatt ..... 617

Numerical Differentiation by the Regularization Method: A. J. MacLeod ..... 625

A Strain Softening Element to Model Fibre Pull-out: G. P. Steven ..... 633

CONFERENCE DIARY ..... 639

ANNOUNCEMENTS ..... 640

Author Index ..... 642